

**UNITED STATES DEPARTMENT OF COMMERCE****United States Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/305,121	05/04/99	GUINAPALA	06816/065002

SCOTT C HARRIS  
FISH AND RICHARDSON PC  
SUITE 1400  
4225 EXECUTIVE SQUARE  
LA JOLLA CA 92037

MMC1/0509

EXAMINER BAUMEISTER, B
---------------------------

ART UNIT 2815	PAPER NUMBER 12
------------------	--------------------

DATE MAILED: 05/09/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
09/305,121

Applicant(s)  
Gunapala et al.

Examiner  
William Baumeister

Art Unit  
2815

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Mar 5, 2001.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1, 3, 4, 9, and 11-20 is/are pending in the application.
- 4a) Of the above, claim(s) 9 and 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 4, 11-14, and 16-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☒ The proposed drawing correction filed on Mar 5, 2001 is: a) ☐ approved b) ☒ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some\* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 16) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_ 20) ☐ Other: \_\_\_\_\_

Art Unit: 2815

## DETAILED ACTION

### *Drawings*

1. The corrected or substitute drawings were received on 3/5/2001. These drawings are NOT approved.

a. Various Figures, apparently including at least FIGs 1, 2, 3A and 3B, should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

b. Various inconsistencies exist between the reference numerals employed in the specification and in the drawings. For example,

- i. Reference numeral 120 is used to denote the band-gap of the GaAs well layer (page 4, line 10). Fig 1 includes this label, but also improperly includes the same numeral 120 leading to the conduction band of the barrier region.
- ii. Page 4, second full paragraph states that the band gap of the AlGaAs 112 is different from the band gap 120 between the GaAs layers 122. No reference numeral 122 is included in Fig. 1.
- iii. Page 5, first full paragraph states that electrons are promoted from one subband 101 to another subband 106. However, FIG 1 does not possess any reference numerals for the conduction subbands, and the valence subbands are labeled 104 and 106 (i.e., subbands for holes, not electrons).

Art Unit:

- iv. Page 5, first full paragraph states that promotion is effective at holes 100 in the quantum well (no holes are depicted). Then, in the next paragraph numeral 100 is employed to describe the quantum well, itself--not the holes.
  - v. The specification does not recite reference numeral 102 which is set forth in Fig. 1 leading to the sidewall of the well's conduction band and the bottom of the well's valence band.
  - vi. In regard to FIG 2, the specification sets forth numeral "220a" for the ground state (page 5, line 19), while Fig 2 sets forth ground state "220."
  - vii. In FIG. 2, reference numeral 220 is also employed for the rectangle in the continuum.
  - viii. FIG. 2 does not include the reference numeral 228, employed in the specification to describe the thermionic emissions (page 7, line 4).
  - ix. Reference numerals 200, 202, 204 and 206, 212, appearing in FIG 2, are not described in the specification.
- c. Appropriate correction to each and every inconsistency, including those not specifically recited herein, is required.

Art Unit:

*Specification*

2. The disclosure is objected to because of the following informalities:

a. The specification sets forth, "the energy level separation and the depth of the quantum well are increased as the thickness of the GaAs layer is decreased." (Page 3, line 21-) It is true that the well thickness will affect the energy level separation, but the well depth is not affected by the well thickness. Rather, the well depth depends upon the height of the adjacent barrier layers.

b. The statement, "the photoelectrons are bound into the continuum level..." (page 9, lines 3 - ) is a non-sequitur.

Appropriate correction is required.

*Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 3, 4, 11-14 and 16-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Independent claims 1 and 17 have been amended to recite, "said barrier layers are sufficiently thick to substantially inhibit carrier tunneling therethrough..."

Art Unit:

The term “substantially inhibit” is unclear, rendering the claims indefinite because no objective standard is provided for how thick the barrier layers must be. Rather, barriers of any thickness--especially those thicker than 100 angstroms--will inhibit tunneling to some extent. See for example, Applicants’ specification which states, “only some particles will tunnel through a barrier between 50 and 100 angstroms, and any barrier greater than 100 angstroms in thickness presents a formidable challenge for tunneling.” (Page 8, lines 4-6)

Thus, it is unclear whether the barriers have to be at least 50 angstroms, 100 angstroms, (per page 8 of the specification), 500 angstroms (see the specification at page 31, line 3) or some other thickness. Accordingly, one of ordinary skill in the art would not be apprised of the metes and bounds of the invention intended to be covered by the claims.

***Claim Rejections - 35 USC § 102***

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Insofar as definite, claims 1, 16-18 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Liu ‘421 for the reasons set forth in the previous Office Action (Paper #9).

Art Unit:

***Claim Rejections - 35 USC § 103***

7. Insofar as definite, claims 1, 11-13, 17, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai et al., Two-color infrared photodetector using GaAs/AlGaAs and strained InGaAs/AlGaAs multiquantum wells [hereinafter Tsai] in view of Liu '421 for the reasons set forth in the previous Office Action.

8. Insofar as definite, claims 3, 4, 14 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Liu or alternatively over Liu/Tsai as applied to the claims above, and further in view of Bethea et al. '685 for the reasons set forth in the previous Office Action (paper #9).

***Response to Arguments***

9. Applicant's arguments filed 3/5/01 have been fully considered but they are not persuasive. Applicants' sole basis for traversing the rejections of the previous Office Action (paper #9) is that the cited art possesses "thin" barrier layers as opposed to barrier layers which are sufficiently thick to substantially inhibit carrier tunneling, as presently set forth in the amended claims.

Applicant has not adequately clarified what thickness constitutes sufficiently thick to substantially inhibit tunneling, but applying the broadest reasonable interpretation, any thickness greater than 50 angstroms would satisfy this language per applicants' specification (page 8). Moreover, even presuming that this language must be interpreted more narrowly such that the

Art Unit:

barrier layers must be on the order of 500 angstroms thick, please note that Liu '421 discloses that the barrier layers are 50 nm (or 500 angstroms) thick (col. 3, lines 37-45). As such, Liu anticipates even the more narrow interpretation.

***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.




Art Unit:

**INFORMATION ON HOW TO CONTACT THE USPTO**

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at (703) 306-9165. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

B. William Baumeister

May 8, 2001



**EDDIE LEE**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**